

Electrochemical and Solid State Letters, 2(10), pp. 534-536, 1999. For purposes of discussion, it is assumed that "Applicant's admitted prior art" refers to paragraphs [0003]-[0005] of the present specification, in view of paragraph 2, page 5 of the Office Action.

To establish a prima facie case of obviousness under § 103, all claim limitations of a claimed invention must be taught or suggested by the prior art. See MPEP, Section 2143.03 and In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). In view of the foregoing authority, the Applicant respectfully submits that the basis relied on by the examiner for the asserted rejection does not support the asserted rejection.

Embodiments of the present invention as recited in claim 1 relate to a method of fabricating an electro-optic semiconductor package. The method comprises providing an integrated circuit (IC) wafer having one or more IC contact pads, the IC contact pads being connected to an IC on the IC wafer, and providing an intermediate wafer having one or more intermediate contact pads, the intermediate contact pads being connected to an electro-optic arrangement on the intermediate wafer. The method further comprises direct copper bonding the IC contact pads to adjacent intermediate contact pads, with the electro-optic semiconductor package resulting.

Accordingly, the asserted rejection is not supported for at least the reason that neither paragraphs [0003]-[0005] of the present specification nor the Fan et al. reference (hereinafter, "Fan") teaches or suggests direct copper bonding the IC contact pads to adjacent intermediate contact pads as required by claim 1. This is acknowledged in the Office Action (page 5, paragraph 5). However, the Office Action alleges that the claimed feature "would have been obvious ... because Fan teaches that [with direct copper bonding] interconnect delays are significantly reduced and system performance is increased." The Office Action cites the first paragraph of Fan as support for this proposition.

However, it is noted that Fan, in the first paragraph thereof (and, indeed, throughout), refers only to the advantages derived by using direct copper bonding to connect *electrical* devices. There is nothing in Fan to suggest that similar advantages might be obtained by using direct copper bonding with *optical* devices.

In this connection, it is further noted that the CAFC has held that "[t]he mere fact that the

prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” In re Fritch, 972 F.2d 1260, 1266 (Fed. Cir. 1992). Further, with regard to combining prior art teachings to contend that the combination renders a claimed invention obvious, the CAFC has held that “[t]here must be some reason, suggestion or motivation found in the prior art whereby a person of ordinary skill in the field of the invention would make the combination. That knowledge cannot come from the applicant’s invention itself.” In re Oetiker, 977 F.2d 1443, 1447, 24 USPQ2d 1443, 1446 (Fed. Cir. 1991).

Here, the only source to be found for the alleged motivation to modify the electrical devices of Fan to arrive at the claimed invention is the applicant's own disclosure. Absent this disclosure, the claimed invention is anything but obvious. Optical devices have been historically difficult to fabricate using silicon-based processes. Typically, processes for fabricating optical devices (e.g., lasers) and processes for fabricating semiconductor devices are incompatible, for example because the respective processes use different materials and because a step or steps in one process could compromise or damage a structure formed in the other process. Thus, integrating optical devices with semiconductor devices has presented long-standing challenges that the present invention addresses in a novel and non-obvious fashion.

It is further observed that the reliance of the Office Action on an argument citing "inherent properties" is misplaced. Specifically, the Office Action states: "[S]eeing as Fan teaches that direct copper bonding is a known in the art method, the optic advantages of using direct copper bonding would be inherent properties" (page 2, paragraph 5). As a threshold matter, it is observed that the meaning of this statement is unclear, for at least the reason that it appears to equate "optic advantages" with "inherent properties." What "advantages" and what "properties" are meant is not clear, and in any event an "advantage" is not a "property." Moreover, whatever is meant by "optic advantages" and "inherent properties," the statement does not bear on the asserted obviousness rejection for at least the reason that, as discussed previously, there is no discussion whatsoever in Fan of optical devices.

Note is further taken of the statement in the Office Action that "[t]he use of old process steps employing new materials is unpatentable," citing In re Maxwell and Landes, 89 USPQ 387

(CCPA 1951). The Applicants respectfully submit that this statement, however it is believed to apply to the present application, is plainly contrary to the holding of In re Maxwell. In that case, the court held that the appellants' use of a new resin developed by others in the making of paper was patentable.

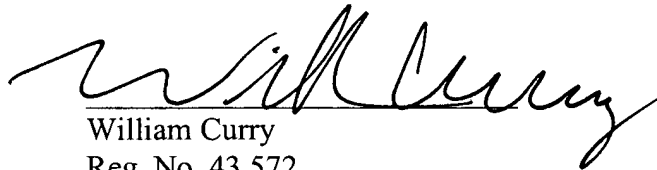
In consideration of the foregoing, claim 1 is clearly allowable over the art of record. Moreover, because claims 2-4, 14-16 and 31 depend on claim 1, they are likewise allowable for at least the reasons discussed in connection with claim 1. Withdrawal of the rejection of claims 1-4, 14-16 and 31 under 35 U.S.C. §103(a) is therefore respectfully requested.

In light of the above discussion, the Applicant respectfully submits that the present application is in all aspects in allowable condition, and earnestly solicits favorable reconsideration and early issuance of a Notice of Allowance.

The Examiner is invited to contact the undersigned at (202) 220-4323 to discuss any matter concerning this application. The Office is authorized to charge any fees related to this communication to Deposit Account No. 11-0600.

Respectfully submitted,

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